

FIG. 1

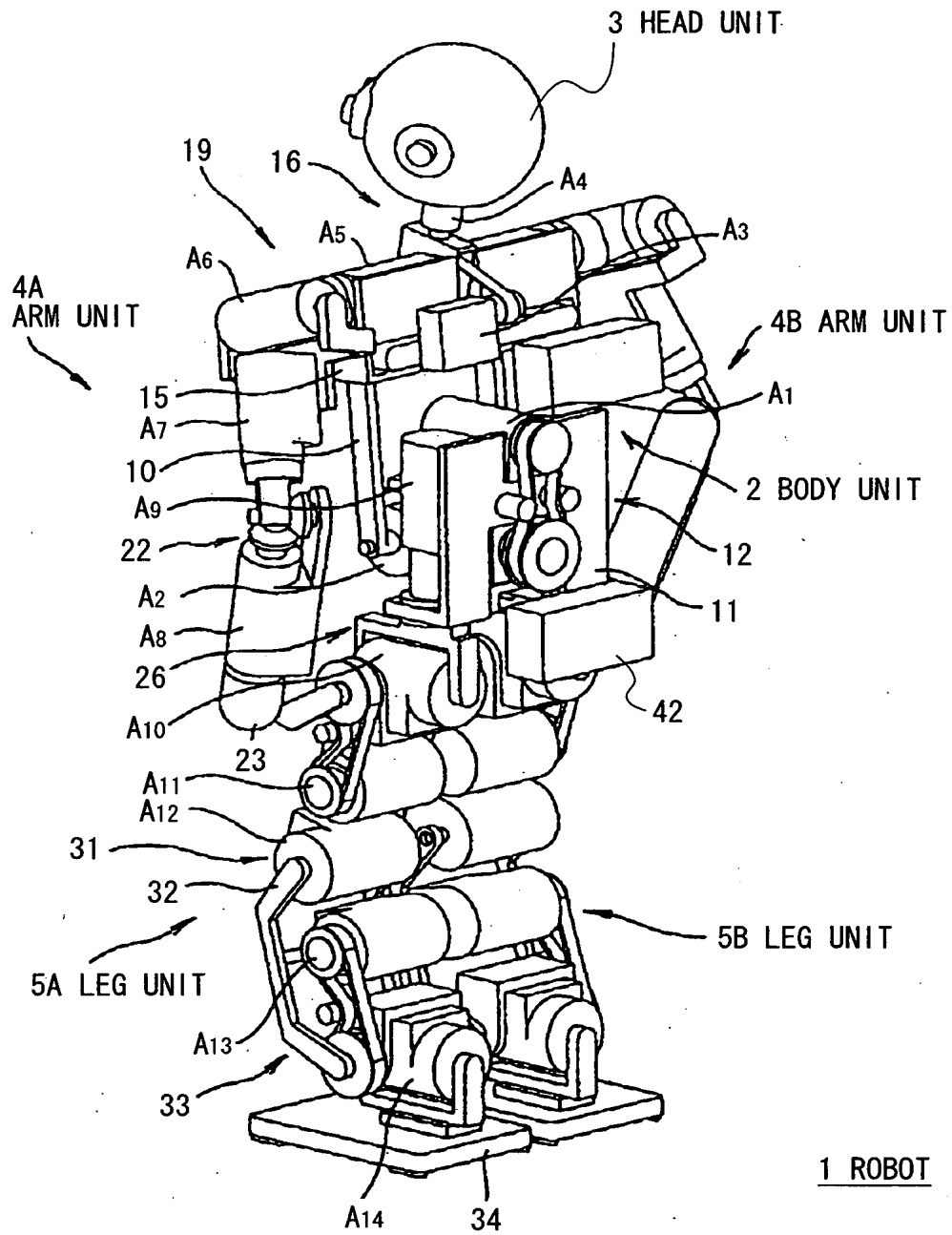


FIG. 2

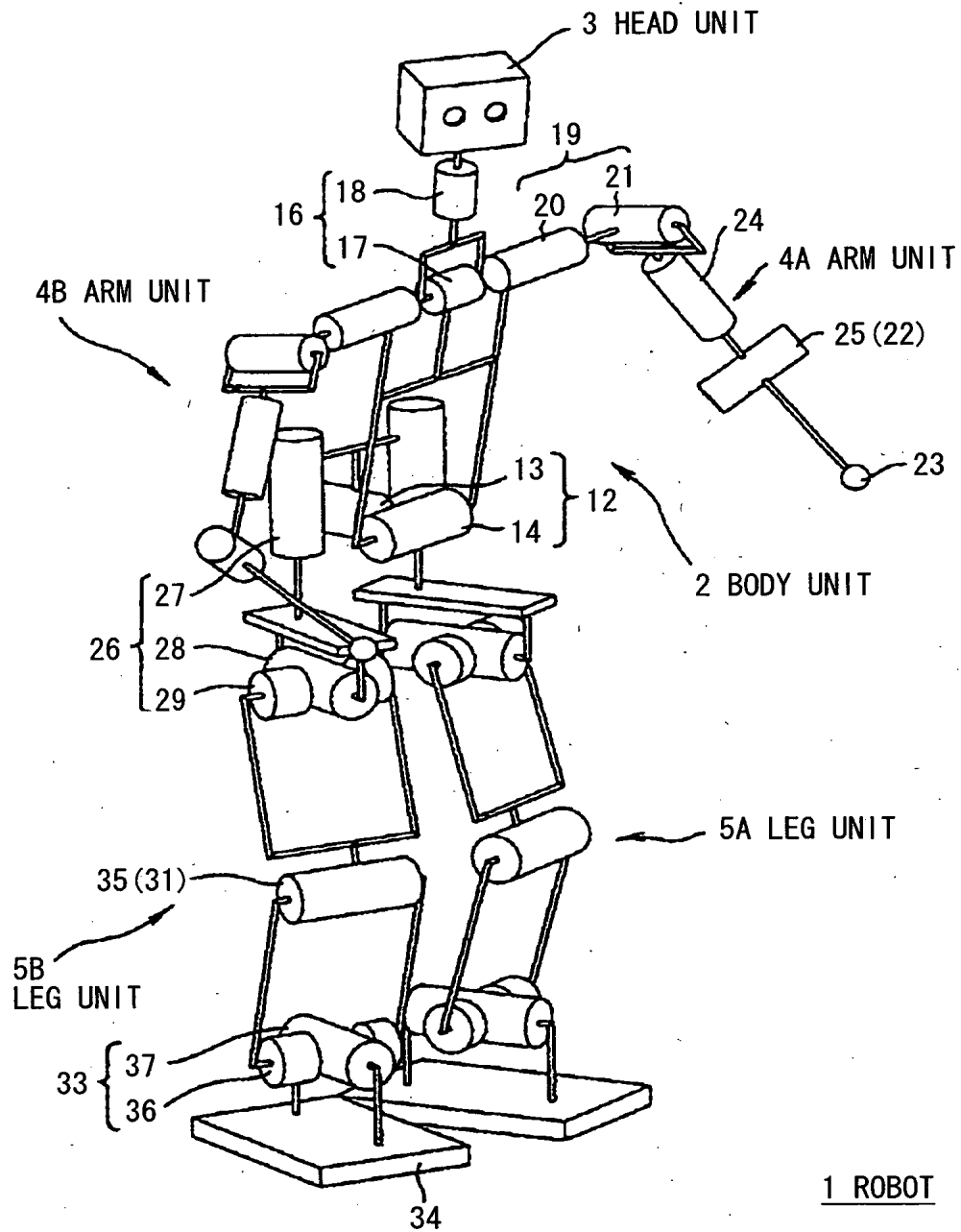


FIG. 3

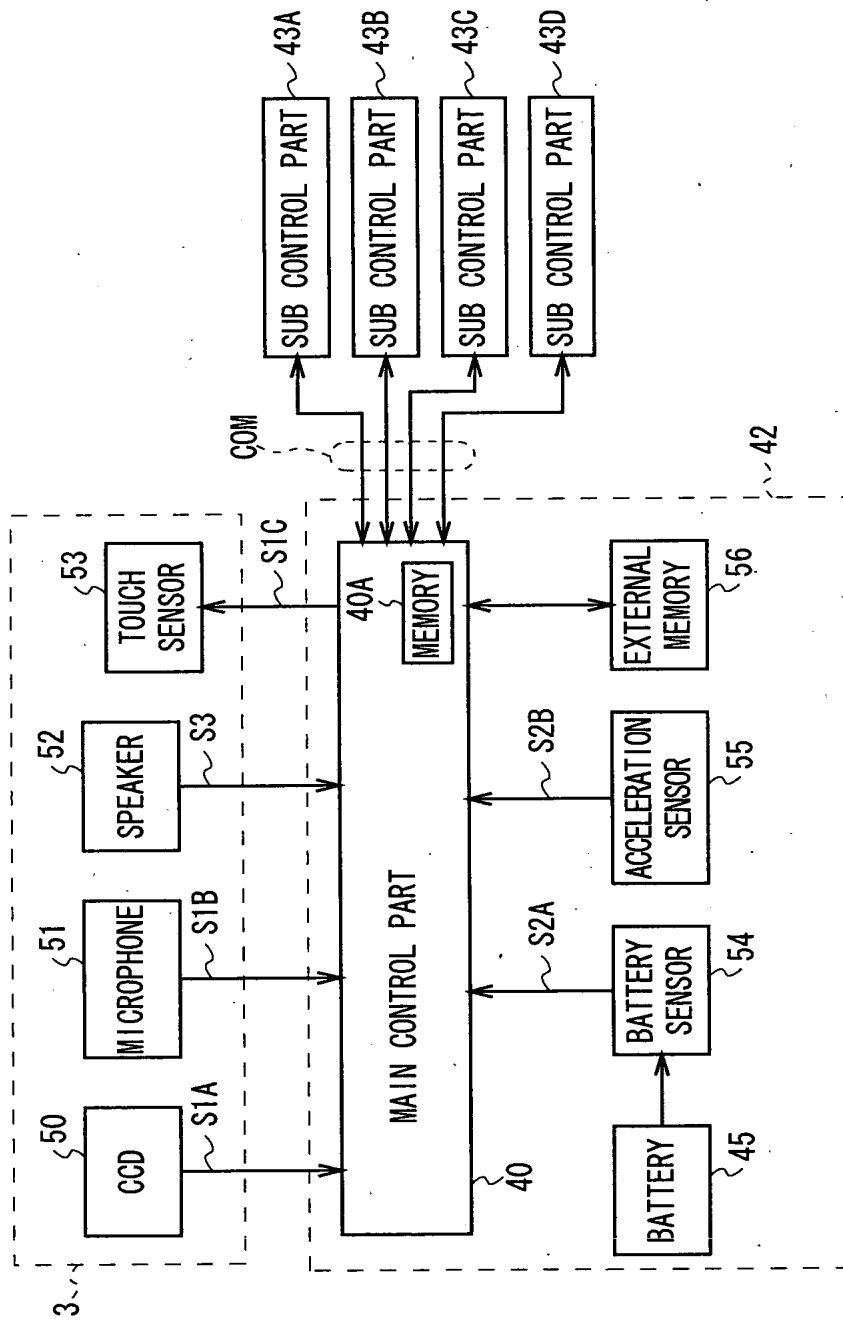


FIG. 5

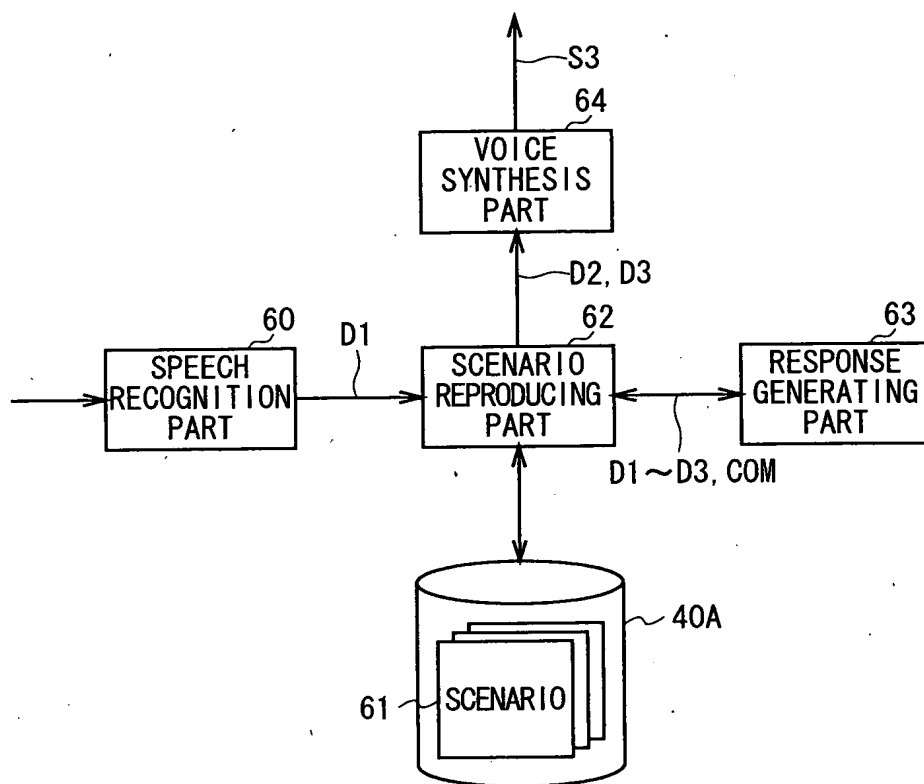


FIG. 6

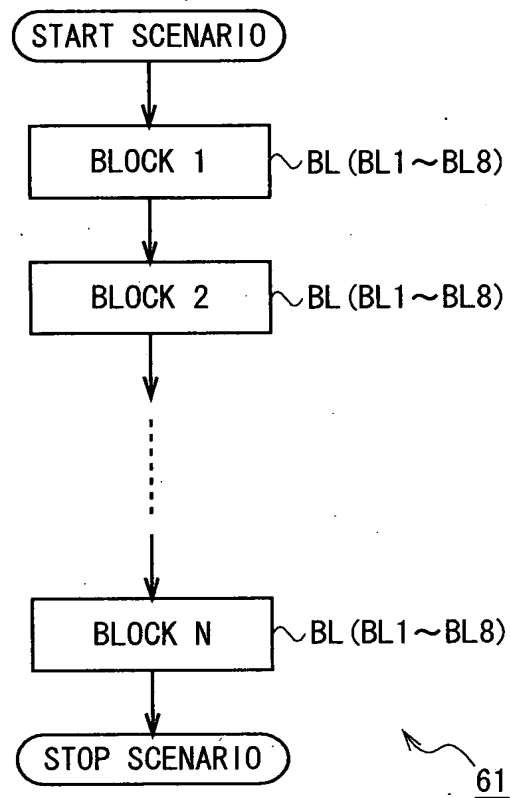


FIG. 7

format:
 node # condition part utterance part action part node # of destination of transition
 condition part: 1 always hit
 utterance part: "..." voice-synthesize text
 0 this line is ignored
 PROSODY: "... reproduce previously prepared voice
 MAKERES: "... generate response (text) corresponding to "... in
 response generating part, and then voice-synthesize it
 action part: text appear corresponding action
 NULL no action
 COUNTER: n do some operation for counter n
 TIMEWAIT: n set time up to time-out

When condition part is true in certain node, it appears utterance shown in utterance part and action shown in action part, and then proceeds to node number of destination of transition.

FIG. 8

—	1	"That's right."	NULL	1000
30				
—				

FIG. 9

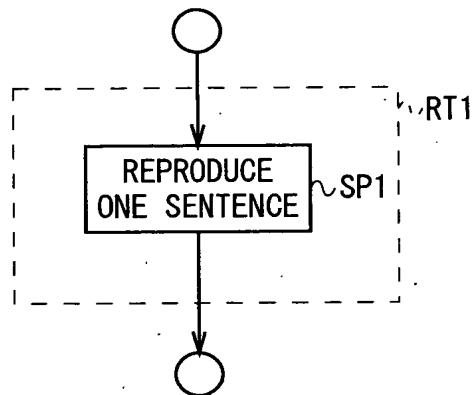


FIG. 10

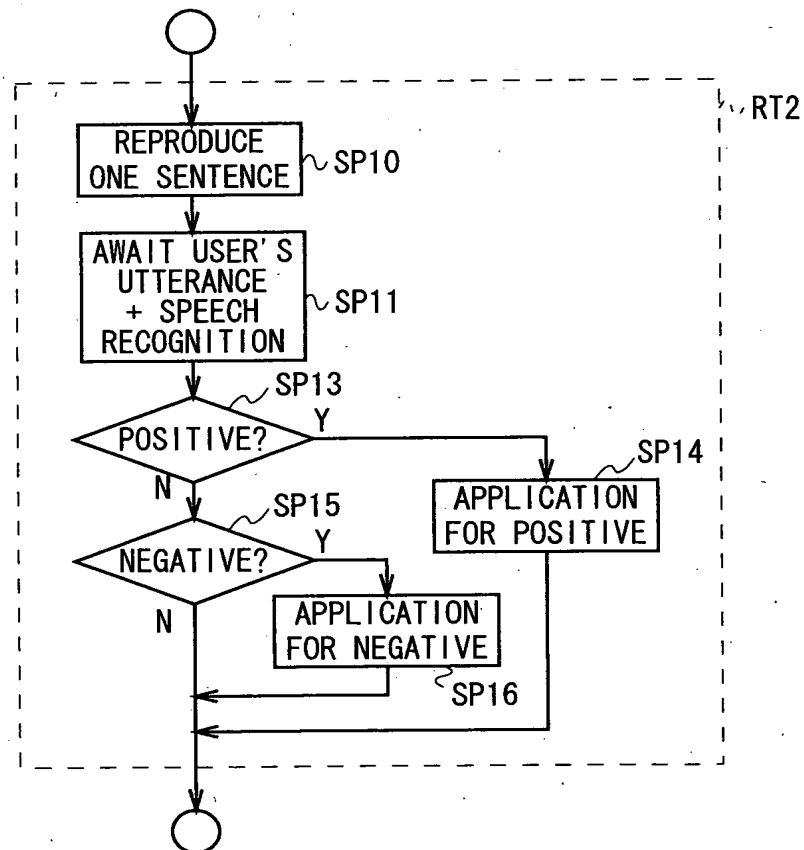


FIG. 12

```

1010      1      "It seems to be that too much drinking coffee and alcohol is unhealthy.  Mr. (Ms.)
xx, are you all right?" shake itself 1030 // question
1030      1      "" TIMEWAIT: 1 20 1040 // set time-out to 20 sec
1040      %VSEM% == "positive" "I see. It's good." satisfaction_A1_3 3000 // response
corresponding to positive
1040      %VSEM% == "negative" "Are you all right? Take good care of yourself." rub its eyes
3000      // response corresponding to negative
1040      (%VSEM% == "return_q") && (%COUNTER: 30% < 3) PROSODY: "n009_0001" COUNTER: 30
INC 1010 // if user's utterance was "Pardon me?", repeat question (to three times)
1040      (%VSEM% == "return_s") && (%COUNTER: 30% < 3) PROSODY: "n009-0002" COUNTER: 30
INC 1010 // if user's utterance was "Return.", repeat question (to three times)
1040      %VOICE% != "" "" NULL 1050 // if user's utterance was unexpected, go to 1050
1040      %TIMEUP: 1% "" "" NULL 3000 // if user did not answer in predetermined time, go to
next block
1050      1      "" NULL 2990
2990      1      "" COUNTER: 31 RESET 3000 // reset counter for control of number of times of
loop (unused)
3000      1      "" COUNTER: 30 RESET 3010

```

FIG.11

"yes|yes, it is|uh-huh|that's right|you're great to find it|you know
well about it|exactly|okay|it's natural|good|sure"

-->
"positive"

"no, I' m not|no, it isn't|wrong|no|that's not right|no way|I hate it|
never||I don't think so||s it?"

-->
"negative"

FIG. 13

```

1010 1 "It seems to be that too much drinking coffee and alcohol is unhealthy. Mr. (Ms.)
xx, are you all right?" shake itself 1030 // question
1030 1 "" TIMEWAIT: 1 20 1040 // set time-out to 20 sec
1040 %VSEM% == "positive" "I see. It's good." satisfaction-A1-3 3000 // response
corresponding to positive
1040 %VSEM% == "negative" "Are you all right? Please take good care of yourself." rub
its eyes 3000 // response corresponding to negative
1040 (%VSEM% == "return_q") && (%COUNTER: 30% < 3) PROSODY: "n009_0001" COUNTER: 30
INC 1010 // if user's utterance was "Pardon me?", repeat question
1040 (%VSEM% == "return_s") && (%COUNTER: 30% < 3) PROSODY: "n009_0002" COUNTER: 30
INC 1010 // if user's utterance was "Return.", repeat question
1040 %VOICE% != "" "" NULL 1050 // if user's utterance was unexpected, go to 1050
(practically, go to 1060)
1040 %TIMEUP: 1% "" NULL 3000 // if user did not answer in predetermined time, go
to next block
1050 1 "" NULL 1060
1060 1 "" MAKERES: "SPECIFIC_ST|GENERAL_ST|LAST_ST" NULL 2060 // generate response
in response generating part (do not generate question and request sentence)
2060 %MAKERES% == "EMPTY" "" NULL 2990 // if it could not generate response, go to
next block
2060 1 "" NULL 2990
2990 1 "" COUNTER: 31 RESET 3000
3000 1 "" COUNTER: 30 RESET 3031

```

FIG. 14

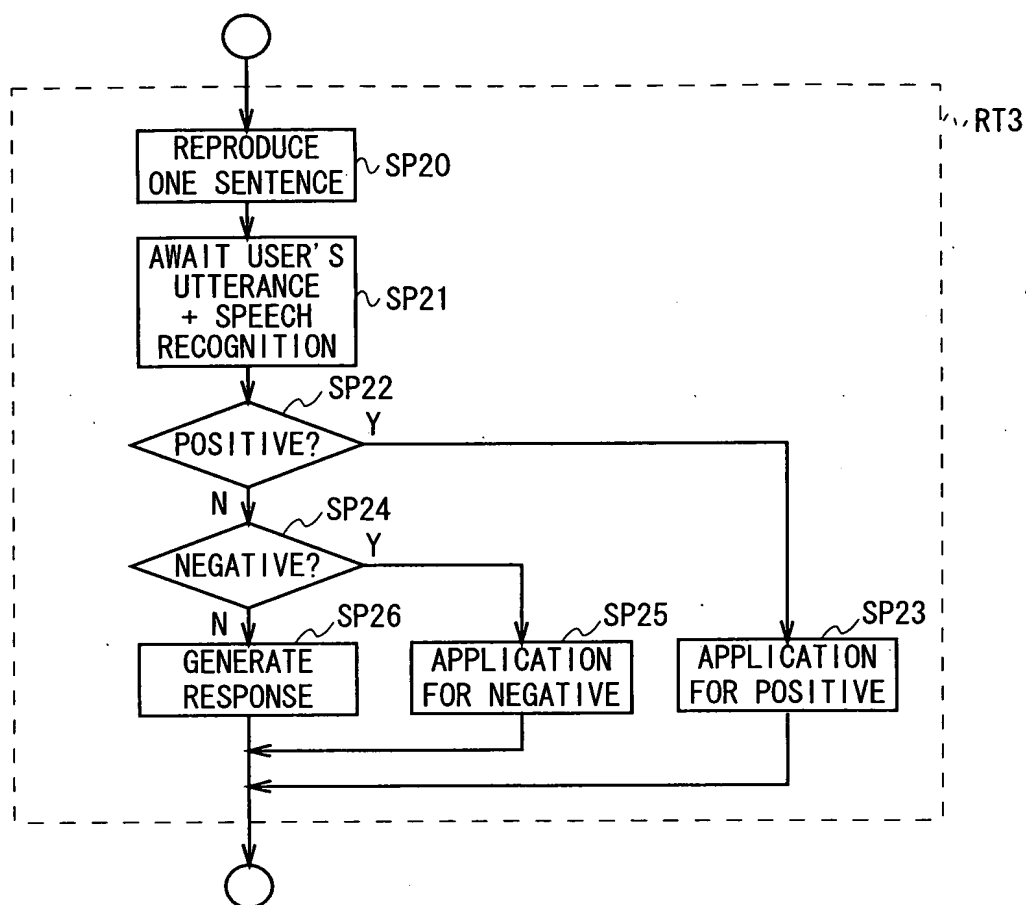


FIG. 15

SPECIFIC	rule depending on scenario: There is possibility to generate "LOOP" (mainly request sentence) and "MAKERES_LOOP" (mainly question sentence).
GENERAL	rule common in all scenarios: There is possibility to generate "LOOP" and "MAKERES_LOOP".
LAST	'last means' rule: Response is always generated to any input. There is possibility to generate "LOOP" and "MAKERES_LOOP".
SPECIFIC_ST	rule depending on scenario: "LOOP" and "MAKERES_LOOP" are not generated.
GENERAL_ST	rule common in all scenarios: "LOOP" and "MAKERES_LOOP" are not generated.
LAST_ST	'last means' rule: Response is always generated to any input. "LOOP" and "MAKERES_LOOP" are not generated.

FIG. 16

#1) agreement :yes
"yes|yeah. |oh, yeah|yeah, yeah|that's what I want to way|maybe|that's it|you know it|there it is|
surely|I bet|that's a good point|it surely is|no doubt|absolutely true|so true|I heard that|I like
that|someone said that|I know it|I've remembered|that's true|I agree with you|I agree|absolutely|
certainly|exactly|correct|you bet|you got it|I think so|I guess so|no difference|can be|could be|
almost|like that|seems like that|something like that|It's OK|OK|good|that's good|I think you are
good|acceptable|right|that's right|that is right|you are right|I think you are right|I suppose that
is right|maybe true|must be true|bingo|that's correct|you are correct|right on|you telling me|you
are right about it|there you are|there you go|there is that|you are not wrong|not wrong|you are on
the right track|I accept it|I guess you are not wrong|I suppose you are not wrong|I think you are
not wrong|I don't mind|I don't care|sure|yes, you can
—>

"Releasing stress is important, isn't it?"

FIG. 17

10/549795

— “<today’s|the day’s> <.+> <plan|schedule> <.+>”

—>

“I have work today.

|| think I’d like to talk with you a lot.”

— “<today’s|recent> <.+> news”

—>

“I don’t know about today’s news yet.

|| wonder whether there is some news. [MAKERES_LOOP]”

— “<I understand|| got> <it|> _END_”

+>

“Do you understand? [LOOP]

|Do you really understand? [LOOP]

||’m glad. You understand it.”

“Do you <think it is|guess it is|feel it is|believe it is|suppose it is to be|seems it is to be|expect it is|imagine it is> <.+> \$THING\$ <?|_END_>”

+>

“Well, I think almost so.

|| don’t think it is \$THING\$.

|What means \$THING\$\$? [MAKERES-LOOP]”

FIG. 18

"It is <.+> \$UNKNOWN-ANY\$"
-->
"Did you say it is" \$UNKNOWN-ANY\$? [MAKERES-LOOP]
Really!
It's \$UNKNOWN-ANY\$.
Sorry! I couldn't catch. [LOOP]
Telephone may be ringing.
Please change topic easier one. [LOOP]
Please study the way of speaking I can easily catch.
I cannot understand difficult words.
Yes, I hear you.
Sorry, please tell me it in another way? [LOOP]
No, I can't understand it.
I confuse if I hear difficult thing.

FIG. 19

—
 “<today’s|the day’s> <.+> <plan|schedule> <.+>”

—>

“I have work today.
 || I think I’d like to talk with you a lot.”

—
 “<today’s|recent> <.+> news”

—>

“I don’t know about today’s news yet.
 || wonder whether there is some news.”

“Do you <think it is|guess it is|feel it is|believe it is|suppose it is to be|seems it is
 to be|expect it is|imagine it is> <.+> \$THING\$ <?!_END_>”

—>

“Well, I think almost so.
 || don’t think it is \$THING\$.
 || wonder what \$THING\$ means.”

FIG. 20

— "It is <.+> \$UNKNOWN-ANY\$"

—>

"\$UNKNOWN-ANY\$

It' s \$UNKNOWN-ANY\$. "

Really!

Sorry! I couldn' t catch. [LOOP]

Telephone may be ringing.

Please change topic easier one.

Please study the way of speaking I can easily catch.

I cannot understand difficult words.

Yes, I hear you.

Sorry, please tell me it in another way?

No, I can' t understand it.

I confuse if I hear difficult thing.

—

FIG. 21

name of tag name of rule file	
PROMPT_1	rules/scenario10_prompt_1.rule
PROMPT_2	rules/scenario10_prompt_2.rule
PROMPT_n	rules/scenario10_prompt_n.rule
SPECIFIC	rules/scenario10_specific.rule
GENERAL	rules/general1.rule
LAST	rules/last_resort1.rule
SPECIFIC_ST	rules/scenario10_specific_straight.rule
GENERAL_ST	rules/general1_straight.rule
LAST_ST	rules/last_report1_straight.rule

FIG. 22

```

4160 1 "Do you like sweets?" incline its head 4170 // question
4170 1 "" TIMEWAIT: 1 20 4180 // set time-out to 20 sec
4180 %VSEM% == "positive" "I see." satisfaction_A1_2 6000 // positive
4180 %VSEM% == "negative" "You don't like so much." it cannot be satisfied_A2-2 6000
// negative
4180 (%VSEM% == "return_q") && (%COUNTER: 30% < 3) PROSODY: "n009_0001" COUNTER: 30
INC 4160 // correspond to "Pardon me."
4180 (%VSEM% == "return_s") && (%COUNTER: 30% < 3) PROSODY: "n009_0002" COUNTER: 30
INC 3010 // correspond to "Return."
4180 %VOICE% != "" "" NULL 4190 // if user's utterance was unexpected, go to 4190
4180 %TIMEUP: 1% "" "" NULL 6000 // if it became time-out, go to next block
4190 1 "" NULL 4200
4200 %COUNTER: 31% >= 2 "" "" NULL 5990 // if loop was repeated twice, go to next
block
4200 1 MAKERES: "SPECIFIC|GENERAL|LAST" NULL 5300 // generate response by response
generation (There is possibility to generate doubt/question.)
5300 1 "" COUNTER: 31 INC 5400 // advance loop counter by one
5400 1 "" TIMEWAIT: 1 10 5500 // set time-out to 10 sec
5500 %COUNTER: 31% >= 2 "" "" NULL 5990
5500 %MAKERES% == "NORMAL" "" "" NULL 5990 // if response was "NORMAL" (mainly,
declarative sentence), go to next block
5500 %MAKERES% == "EMPTY" "" "" NULL 5990 // if response could not be generated, go
to next block
5500 %MAKERES% == "LOOP" "" "" NULL 4180 // if response was "LOOP" (mainly, request
sentence), go to 4180
5500 %TIMEUP: 1% "" "" NULL 5990 // if it became time-out, go to next block

```

FIG. 23

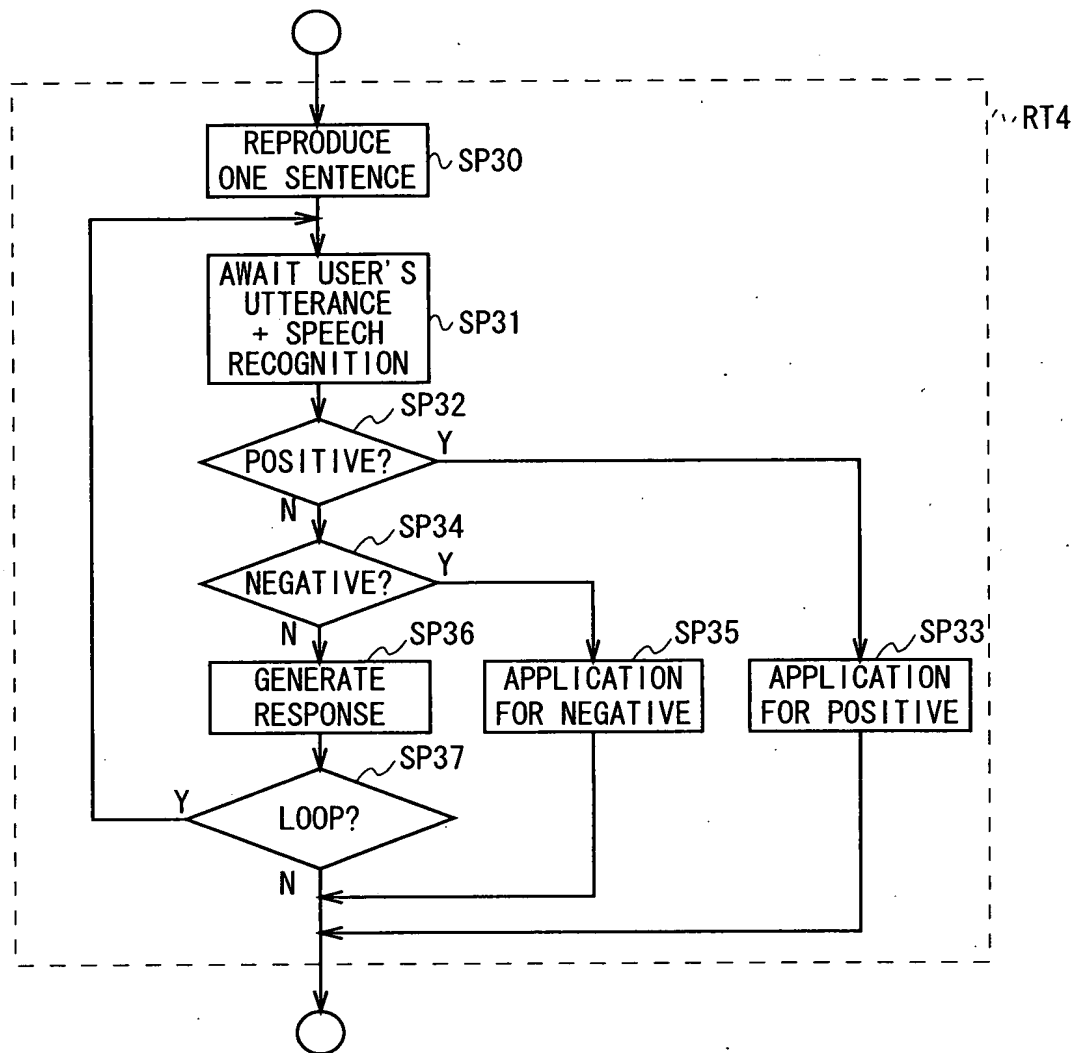


FIG. 24

```

4160 1 "Mr. (Ms.) xx, do you like sweets?" incline its head 4170 // question
4170 1 "" TIMEWAIT: 1 20 4180
4180 %VSEM% == "positive" "You do." satisfaction_A1_2 6000 // positive
4180 %VSEM% == "negative" "You don't like so much." it cannot be satisfied_A2-2 6000
// negative
4180 (%VSEM% == "return_q") && (%COUNTER: 30% < 3) PROSODY: "n009_0001" COUNTER: 30
INC 4160 // correspond to "Pardon me."
4180 (%VSEM% == "return_s") && (%COUNTER: 30% < 3) PROSODY: "n009_0002" COUNTER: 30
INC 3010 // correspond to "Return."
4180 %VOICE% != "" "" NULL 4190 // if user's utterance was unexpected, go to 4190
4180 %TIMEUP: 1% "" "" NULL 6000 // if it became time-out, go to next block
4190 1 "" NULL 4200
4200 %COUNTER: 31% >= 2 "" NULL 5990 // if loop was repeated twice, go to next block
4200 1 MAKERES: "SPECIFIC|GENERAL|LAST" NULL 5300 // generate response by response
generation (There is possibility to generate doubt/question.)
5300 1 "" COUNTER: 31 INC 5400
5400 1 "" TIMEWAIT: 1 10 5500
5500 %COUNTER: 31% >= 2 "" NULL 5990
5500 %MAKERES% == "NORMAL" "" NULL 5990 // if response was declarative sentence, go
to next block
5500 %MAKERES% == "EMPTY" "" NULL 5990 // if response could not be generated, go to
next block
5500 %MAKERES% == "MAKERES_LOOP" && %VOICE% != %NULL%
MAKERES: "SPECIFIC|GENERAL|LAST" NULL 5300 // if response was "MAKERES_LOOP" (mainly,
question sentence), await utterance & generate response (There is possibility to generate
question/request sentence.)
5500 %TIMEUP: 1% "" NULL 5990 // if it became time-out, go to next block

```

FIG. 25

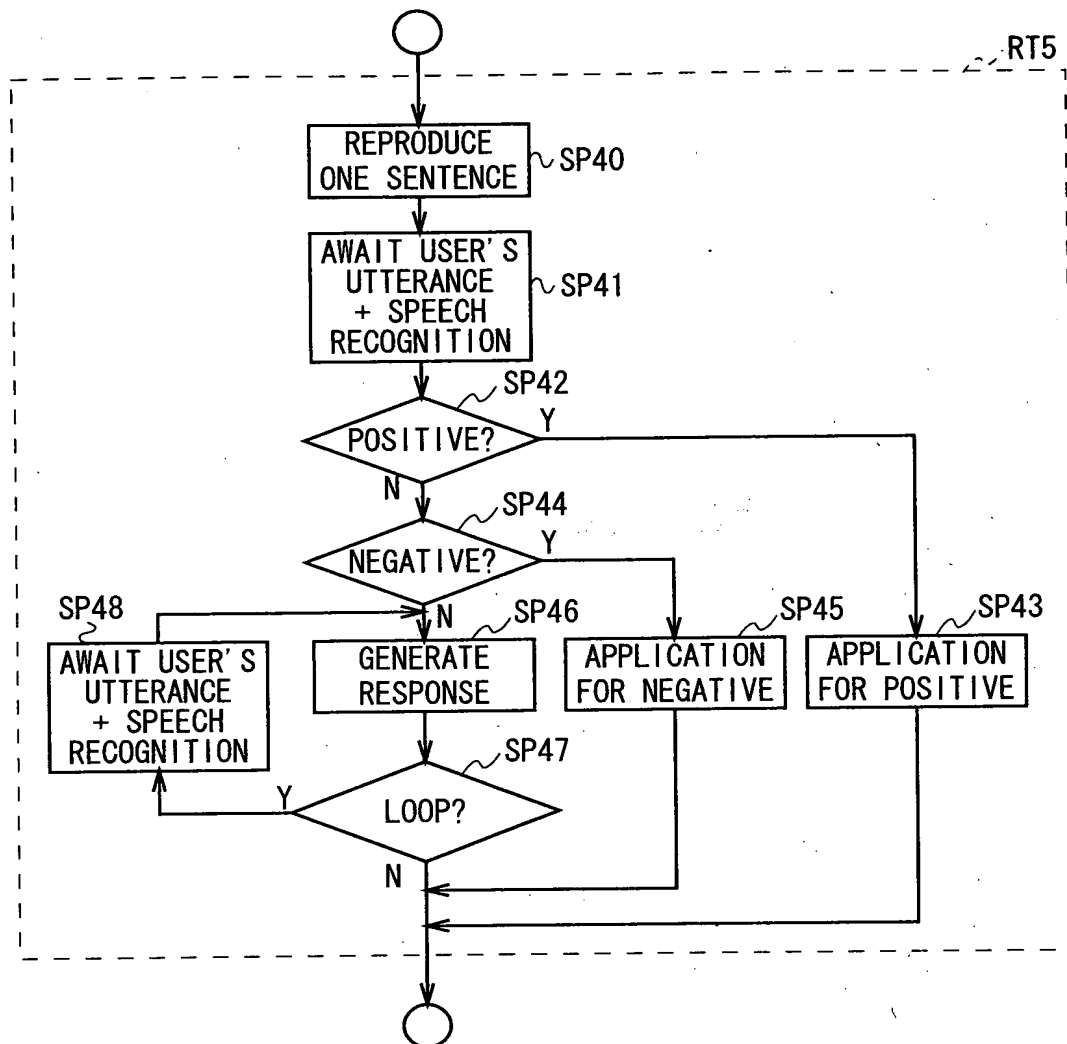


FIG. 26

```

4160 1 "Mr. (Ms.) xx, do you like sweets?" incline its head 4170 // question
4170 1 "" TIMEWAIT: 1 20 4180
4180 %VSEM% == "positive" "You do." satisfaction_A1_2 6000 // positive
4180 %VSEM% == "negative" "You don't like so much." it cannot be satisfied_A2-2 6000
// negative
4180 (%VSEM% == "return_q") && (%COUNTER: 30% < 3) PROSODY: "n009_0001" COUNTER: 30
INC 4160 // correspond to "Pardon me."
4180 (%VSEM% == "return_s") && (%COUNTER: 30% < 3) PROSODY: "n009_0002" COUNTER: 30
INC 3010 // correspond to "Return."
4180 %VOICE% != "" "" NULL 4190 // if user's utterance was unexpected, go to 4190.
4180 %TIMEUP: 1% "" "" NULL 6000 // if it became time-out, go to next block
4190 1 "" NULL 4200
4200 %COUNTER: 31% >= 2 "" "" NULL 5990 // if loop was repeated twice, go to next block
4200 1 MAKERES: "SPECIFIC|GENERAL|LAST" NULL 5300 // generate response by response
generation (There is possibility to generate doubt/question.)
5300 1 "" COUNTER: 31 INC 5400
5400 1 "" TIMEWAIT: 1 10 5500
5500 %COUNTER: 31% >= 2 "" "" NULL 5990
5500 %MAKERES% == "NORMAL" "" "" NULL 5990 // if response was "NORMAL" (mainly,
declarative sentence), go to next block
5500 %MAKERES% == "EMPTY" "" "" NULL 5990 // if response could not be generated, go to
next block
5500 %MAKERES% == "LOOP" "" "" NULL 4180 // if response was "LOOP" (mainly, request
sentence), go to 4180
5500 %MAKERES% == "MAKERES_LOOP" && %VOICE% != %NULL%
MAKERES: "SPECIFIC|GENERAL|LAST" NULL 5300 // if response was "MAKERES_LOOP" (mainly,
question sentence), await utterance & generate response (There is possibility to generate
question/request sentence.)
5500 %TIMEUP: 1% "" "" NULL 5990 // if it became time-out, go to next block

```

FIG. 27

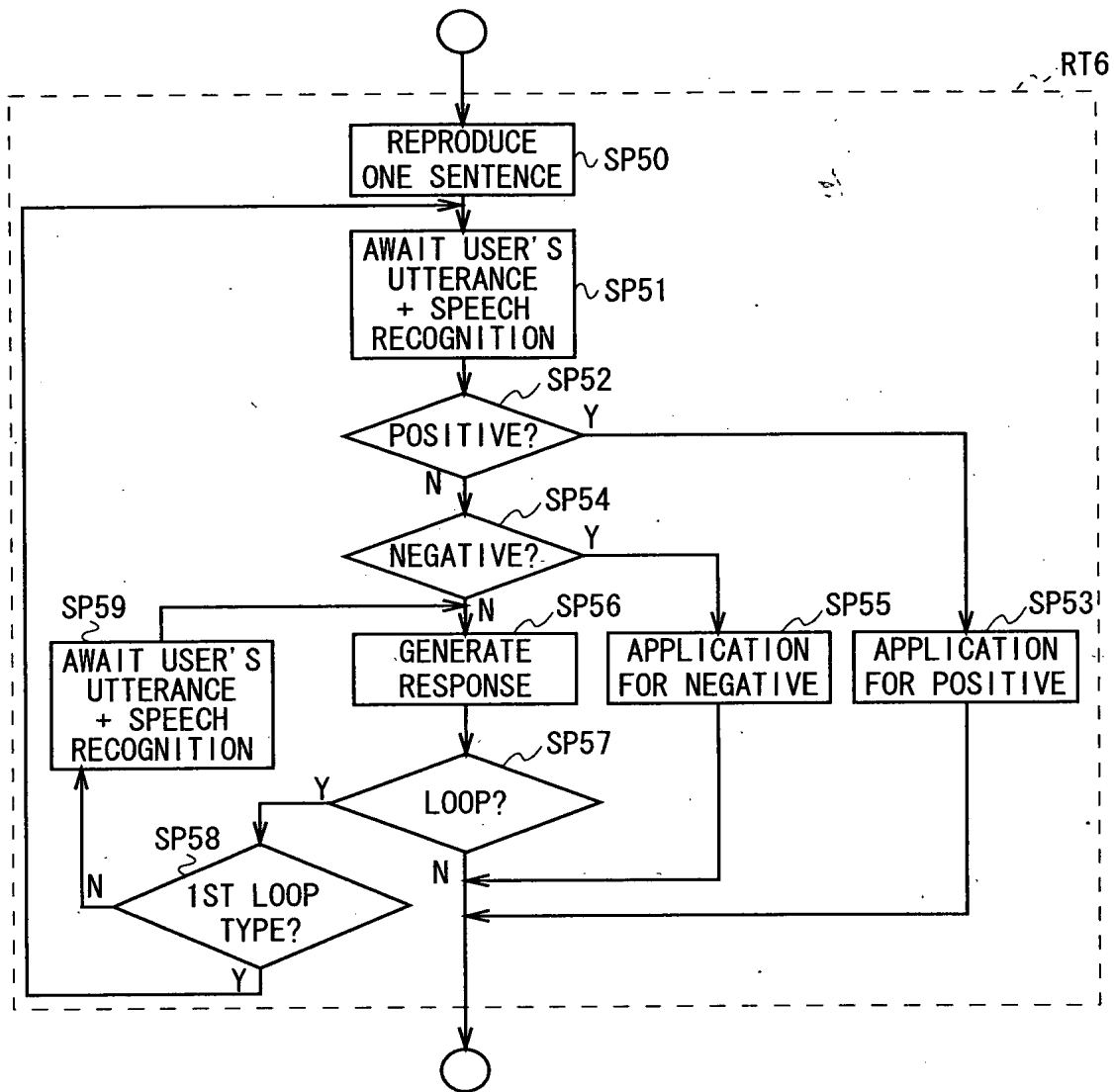


FIG. 28

```

3034 1 "" TIMEWAIT: 1 10 4040 // set time-out to 10 sec
4040 %VOICE% != %NULL% MAKERES: "SPECIFIC_ST|GENERAL_ST|LAST_ST" NULL 4140
// generate response in response generating part (do not generate doubt/question sentence)
4040 %TIMEUP: 1% "" NULL 4150 // if it became time-out, go to next block
4140 %MAKERES% == "EMPTY" "" NULL 4150 // if response could not be generated, go
to next block
4140 1 "" NULL 4150
4150 1 "" COUNTER: 31 RESET 4160 // reset counter

```

FIG. 29

```

2050 1 "I think so." NULL 2950 // prompt "I think so."
2950 1 "" TIMEWAIT: 1 10 3050
3050 %VOICE% != %NULL% MAKERES: "SPECIFIC_ST|GENERAL_ST|LAST_ST" NULL 3150
// generate response in response generating part (do not generate doubt sentence/question
sentence)
3050 %TIMEUP: 1% "" NULL 3160 // if it became time-out, go to next block
3150 %MAKERES% == "EMPTY" "" NULL 3160 // if response could not be generated,
go to next block
3150 1 "" NULL 3160

```

FIG. 30

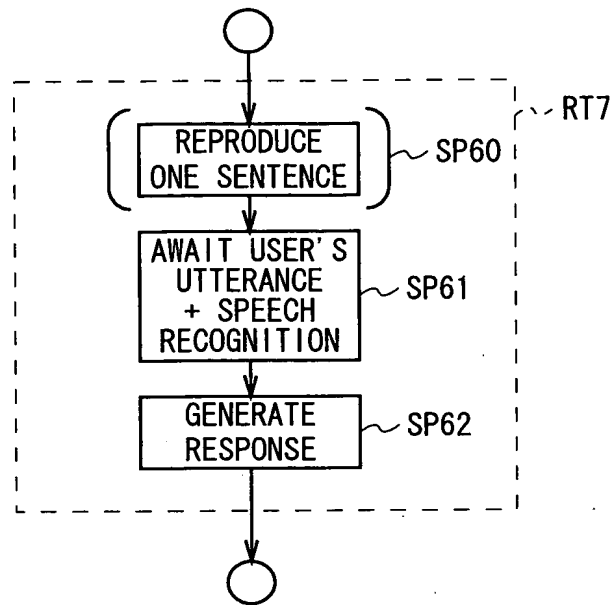


FIG. 31

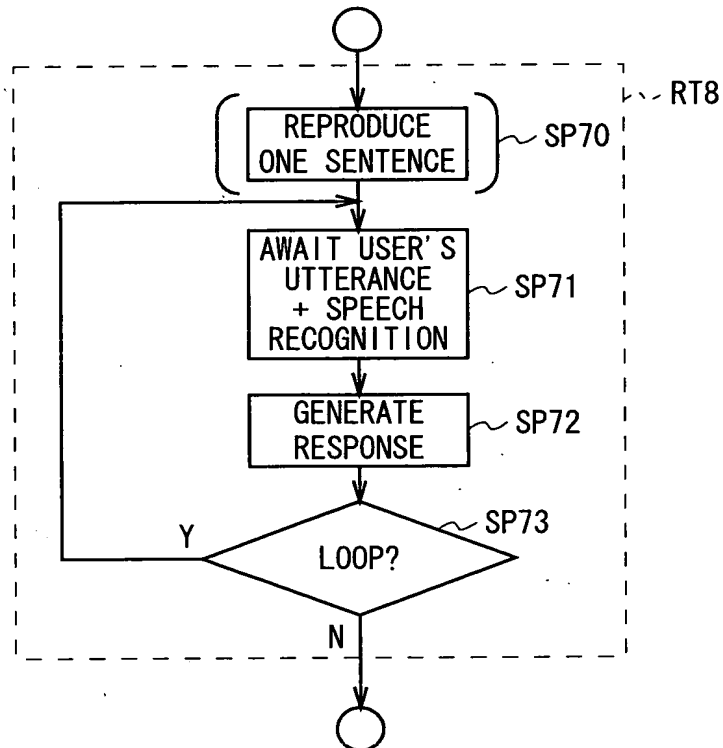


FIG. 35

001 It' s nice.
002 It' s cool.
003 It' s great.
004 That' s right.
005 What do you think I should do if it became so?
006 What should I do if it became so?
007 How is there?
008 What did you think at that time?
009 How was the place?
010 Is it real?
011 Do you think it is real?
012 But what should I do?
013 How about you?
014 How it is like?
015 How is the place?
016 How is the man?
017 What should I do?
018 How about it?
019 How is it?
020 How do you think about it?
021 What do you think how it is?
022 I' d like to hear your opinion.
023 I' d like you to tell me if I' m wrong.
024 How was your impression?
025 Why do you like it?
026 I wonder what will happen.
027 What do you think it is?
028 What do you think about?
029 Can even I do it?
030 What will happen if it is failed?
031 Do you think it' s interesting?
032 No?
033 Do you think so?

FIG. 32

```

9030 1 "" TIMEWAIT: 1 10 10030 // 10 sec till time-out
10030 %COUNTER: 31% > = 2 "" NULL 10340 // if loop was repeated twice, go to next
block
10030 %VOICE% != %NULL% MAKERES: "SPECIFIC|GENERAL|LAST" NULL 10130 // generate
response in response generating part (There is possibility to generate doubt sentence/question
sentence.)
10030 %TIMEUP: 1% "" NULL 10340 if it became time-out, go to next block
10130 1 "" COUNTER: 31 INC 10230
10230 1 "" TIMEWAIT: 1 10 10330 // 10 sec till time-out
10330 %COUNTER: 31% > = 2 "" NULL 10340 // if loop was repeated twice, go to next
block
10330 %MAKERES% == "NORMAL" "" NULL 10340
10330 %MAKERES% == "EMPTY" "" NULL 10340
10330 %MAKERES% == "LOOP" "" NULL 10030
10330 %MAKERES% == "MAKERES_LOOP" && %VOICE% != %NULL%
MAKERES: "SPECIFIC|GENERAL|LAST" NULL 10130
10330 %TIMEUP: 1% "" NULL 10340

```

FIG. 33


```

9020 1 "No?" NULL 9020 // prompt "No?"
9030 1 "" TIMEWAIT: 1 10 10090 // 10 sec till time-out
10030 %COUNTER: 31% >= 2 "" NULL 10340 // if loop was repeated twice, go to next
block
10030 %VOICE% != %NULL% MAKERES: "SPECIFIC|GENERAL|LAST" NULL 10130 // generate
response in response generating part (There is possibility to generate doubt sentence/question
sentence.)
10030 %TIMEUP: 1% "" NULL 10340 if it became time-out, go to next block
10130 1 "" COUNTER: 31 INC 10230
10230 1 "" TIMEWAIT: 1 10 10330 // 10 sec till time-out
10330 %COUNTER: 31% >= 2 "" NULL 10340 // if loop was repeated twice, go to next
block
10330 %MAKERES% == "NORMAL" "" NULL 10340
10330 %MAKERES% == "EMPTY" "" NULL 10340
10330 %MAKERES% == "LOOP" "" NULL 10030
10330 %MAKERES% == "MAKERES_LOOP" && %VOICE% != %NULL%
MAKERES: "SPECIFIC|GENERAL|LAST" NULL 10130
10330 %TIMEUP: 1% "" NULL 10340

```

FIG. 34

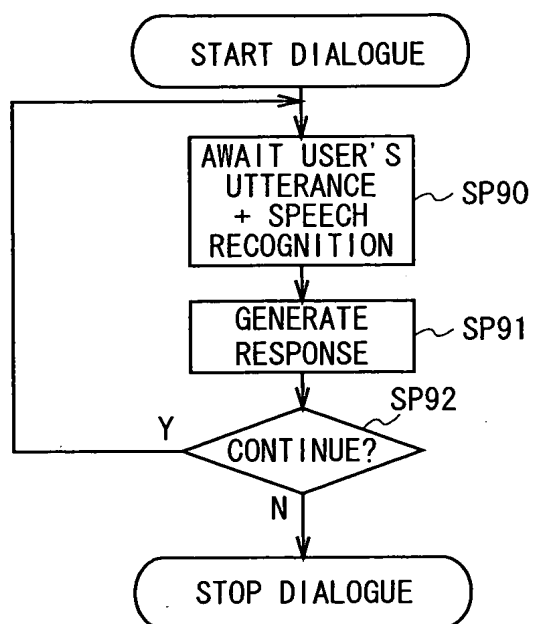


FIG. 36

EXPLANATION OF REFERENCE NUMERALS

1 -- ROBOT, 40 -- MAIN CONTROL PART, 40A -- INTERNAL MEMORY, 51 -- MICROPHONE, 52 -- SPEAKER, 60 -- SPEECH RECOGNITION PART, 61 -- SCENARIO, 62 -- SCENARIO REPRODUCING PART, 63 -- RESPONSE GENERATING PART, 64 -- VOICE SYNTHESIS PART, D1 - D3 -- CHARACTER STRING DATA, S3 -- AUDIO SIGNAL, BL, BL1 - BL9 -- BLOCK, RT1 - RT9 -- BLOCK REPRODUCING PROCEDURE.